

COMPLETION REPORT

Comparative Study between Japan and Myanmar: the effect of flooding impacts on the River Morphology And social environment

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We have finished our research project with 400 questioner surveys with ground check and interview with local people in the flooding area in the Ayeyarwady Delta, Myanmar especially within Hinthada and Nyaung Done Areas. We tried to measure the river channel meandering pattern by floods in the every raining season. We have also conducted extensive participant observations by attending seminars and events pertaining to the topic of flooding impacts on river morphology and social environments in the Academic Meeting of the Association of Japanese Geographers on March 28, 2019. A workshop and seminar focus on flood impacts on physical and socio-economic environments with totaling 125 local participants was held at the Nyaungdone on September 8, 2018 and we received wider interest from the community peoples. Then we also presented the paper about our results in Myanmar Academy of Arts and Science paper reading section on September 28, 2018. In this study we analyzed river channels shape and how they change over time. In this study we analyzed the flood development of landforms in the study area is from landform classification map (the terrain features as river changes of the Ayeyarwady River delta using a combination of aerial photos (2004), topographic maps (2004) at 1:50,000 scale, Landsat imagery (+ETM7,path 133 and row 48, 4 February 2017, UTM 47 zone), version 2 of the Global digital elevation model (ASTER-2 data) from USGS, on ArcGIS and analysis flood condition and its effected area. Then we delineated polygons outlining the active stream channel as of 1944, 1989, 1999 and 2015 in digitized data at 1:5000 scale and derived active channel width, sinuosity, and channel area for these four years. For 1944 we used topographic maps of 1:63,360 scale, for 1989 we used Terra Look images (Path 133 and Row 48, 16 January 1989), for 1999 we used Terra Look images (Path 133 and Row 48, 30 December 1999), and for 2015 we used Google Earth images. We assessed changes in the channel pattern by visual inspection, and then derived values for mean channel width, total channel area, and sinuosity by measuring channel width at ~5.58 km intervals along the study reach and measuring distances along the centerline of the polygon representing the river channel. This technique yielded approximately 17 width values for each polygon, from which we calculated the areas of channel sand mid-channel bars for each polygon. The channel pattern and channel movement, the formation of channel-bar within the river course and channel bank erosion by annual flooding are observed within the study area. Finally we made questioner survey about the communication links and infrastructure such as power plants, roads and bridges are damaged and disrupted, economic activities come to a standstill, resulting in dislocation and the dysfunction of normal life for a period much beyond the duration of the flooding, and predicted the response of the Ayeyarwady River to future climate change and the effects on the occurrence of natural disasters in Myanmar. Our comparative study examines the discourse and understanding of flooding impacts among river channel changes and socio-economic conditions between Myanmar and Japanese deltas. There are both positive and negative environmental effects of flooding in every place. Although the large amounts of water and suspended river sediment over vast areas of the Myanmar delta areas are distributed by annual floods, Japanese delta do not

have such large amounts of water and suspended river sediment due to good river channel management system. Therefore, immediate impacts of flooding include loss of human life, damage to property, destruction of crops, loss of livestock, non- functioning of infrastructure facilities and deterioration of health condition owing to waterborne diseases in Myanmar delta areas. Immediate flash floods, with little or no warning time, cause more deaths than slow-rising riverine floods in Myanmar delta. In the future, the flooding and natural disaster or hazards problems between Myanmar and Japan should be observed and implement the disaster management and prevention of hazard and risk problem and conservation activities in the Myanmar Delta. I think that a long-term disaster prevention results like Japan should be introduced in order to be able to live later. In addition, flooding can destroy the natural balance of the ecosystem. Therefore chemicals and other hazardous substances in water and eventually contaminate the water research should be done in the Myanmar Delta.

Publication of the Results of Research Project:

Verbal Presentation (Date, Venue, Name of Conference, Title of Presentation, Presenter, etc.)

Kay Thwe Hlaing, Aung Swe, Khin Khin Htay (2019) Effects of Flood Impacts on River Morphology and Social Environments in the Ayeyarwady Delta, Regional Forum on Building Resilient Asian Deltas - 16-18 Oct in Bangkok

Kay Thwe Hlaing (2018) Panel Discussion on the Myanmar River Delta The 2018 Lower Mekong Research Symposium, December 13-14, 2018 in Ho Chi Minh City, Vietnam

Aung Swe, Khin Khin Htay, Kay Thwe Hlaing (2017) Study on Morphological Changes of the Ayeyarwady River from Pyay to Hinthada, Myanmar Academy of Arts and Sciences Conference, September 27-28, 2018, Yangon, Myanmar

Thesis (Name of Journal and its Date, Title and Author of Thesis, etc.)

Aung Swe, Khin Khin Htay, Kay Thwe Hlaing (2018) Study on Morphological Changes of the Ayeyarwady River from Pyay to Hinthada, Journal of Myanmar Academy of Arts and Sciences, Myanmar

Book (Publisher and Date of the Book, Title and Author of the Book, etc.)